

**Math 113 Intro Stats Final 2020 Fall**

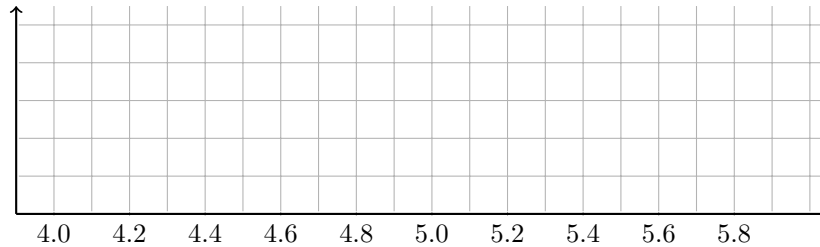
Name: \_\_\_\_\_

1. (15 points) Researchers measure the fasting glucose levels (in mmol/L) of 200 girls ages 10.0–10.5. The results are summarized in the table below.

Fill out the table with the midpoint, relative frequency, and cumulative frequency for each class.

Class	4.0–4.4	4.5–4.9	5.0–5.4	5.5–5.9
Midpoint				
Frequency	30	84	66	20
Relative Frequency				
Cumulative Frequency				

2. (15 points) For the same data as in the previous question, sketch the relative frequency histogram on the axes below, labelling the  $y$  axis.



3. (15 points) For the same data as in the previous question, find the computed mean (i.e., weighted average).

3. \_\_\_\_\_

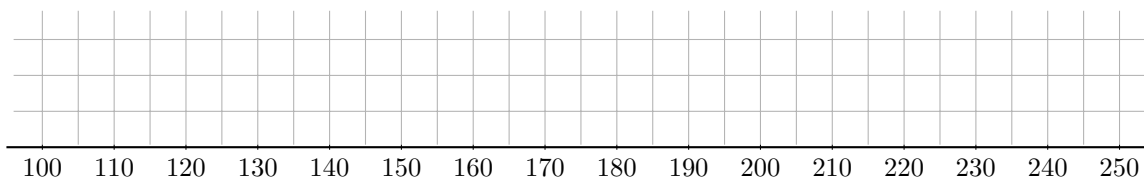
4. (15 points) Researchers measured the total cholesterol level in mg/dL for a random sample of 159 residents of the community. The measurements have been tabulated and ordered from smallest measurement to largest measurement below.

112 112 112 112 113 117 119 120 120 123 123 126 128 128 129 129 129 129 129 131  
 133 134 134 134 134 134 135 135 135 137 141 141 141 144 144 144 144 144 144 145  
 146 146 147 148 148 148 148 148 148 149 149 150 150 150 150 153 153 153 153 153  
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 210 210 210 214 214 215 215 215 215 217 217 219 219 223 223 223 223 223 223 223  
 224 226 230 230 230 231 234 235 235 235 235 239 239 239 239 242 243 244 244 245

- 4a. Find the minimum  $x_1$ , first quartile  $q_1$ , median  $q_2$ , third quartile  $q_3$ , and maximum  $x_n$  of the dataset.

4a. \_\_\_\_\_  
 $x_1$   $q_1$   $q_2$   $q_3$   $x_n$

- 4b. Graph the data in a box plot on the axis provided.



5. (10 points) Human leukocyte antigen (HLA) is a protein found on most cells in your body and is used to match a patient with a donor for a bone marrow transplant. The probability that two unrelated people are an HLA match is 1 out of 20 000. Suppose a patient needs a bone marrow transplant and has no siblings. What is the chance that the patient finds a suitable donor in a registry of 30 000 donors, none of which are related to the patient?

5. \_\_\_\_\_

6. (10 points) The following are the SAT scores of 8 randomly chosen college-bound high school seniors in 2020

949, 991, 812, 1292, 1211, 901, 983, 1119

6a. Find the mean, median, variance and standard deviation of this sample.

6a. Mean: \_\_\_\_\_. Median: \_\_\_\_\_. Variance: \_\_\_\_\_.

Standard deviation: \_\_\_\_\_.

6b. If the mean SAT score of all college-bound high school seniors was normally distributed, with a mean of 1051 and a standard deviation of 211.2, then find the interval centered around the mean that contains 68% of all the scores in the population.

6b. Lower bound of the interval: \_\_\_\_\_.

Upper bound of the interval: \_\_\_\_\_.

6c. What is the relative frequency of the scores in the sample that fall in the interval you found in (b)?

6c. \_\_\_\_\_

6d. Would you generally expect that relative frequency to be close to 68% or not, and why do you think so?

6d. \_\_\_\_\_

7. (10 points) It is well-established that the lifetime risk for brain cancer in the general population is 0.62% (i.e., 0.62% of people will develop a primary malignant brain/CNS tumor during their lifetimes). However, the brain cancer risk for vineyard workers may be higher due to the use of pesticides. To test whether this is the case, researchers surveyed all 74 143 people that worked on vineyards between 1984 and 1986, and found that 519 developed a primary malignant brain/CNS tumor later in life. Construct a 95% confidence interval for the lifetime risk for brain cancer in vineyard workers.

7a. Find the critical value  $z_{\alpha/2}$ .

7a. \_\_\_\_\_

7b. Find the error  $E = z_{\alpha/2} * \sqrt{\hat{p} * \hat{q}/n}$ .

7b. \_\_\_\_\_

7c. Find the confidence interval  $\hat{p} - E < p < \hat{p} + E$ .

7c. \_\_\_\_\_  $< \mathbf{p} <$  \_\_\_\_\_

8. (10 points) Suppose that in a random sample of 200 smartphone users, 63 used an iphone. Conduct a hypothesis test at significance level 0.03 to test the claim that less than 36% of smartphone users use an iphone.

8a. State the null hypothesis.

8a. \_\_\_\_\_

8b. State the alternative hypothesis.

8b. \_\_\_\_\_

8c. Find the P-value.

8c. \_\_\_\_\_

8d. Formulate your conclusion

8d. \_\_\_\_\_